

Appl. No. 09/706,937
Amdt. dated April 15, 2009
Reply to the office action of December 23, 2008

APR 15 2009

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A computer-implemented method of operating a navigation system, said method comprising:

using a geographic database stored on a computer readable storage medium containing data that represents geographic features, wherein said database includes an indexing structure with three dimensions, wherein a first dimension of said three dimensions includes latitude boundary information, wherein a second dimension of said three dimensions includes longitude boundary information, wherein said latitude boundary information and said longitude boundary information define a bounded area represented by a maximum latitude, a maximum longitude, a minimum latitude and a minimum longitude, wherein a third dimension of said three dimensions includes rank information, wherein each of said geographic features have an associated rank information, wherein said rank information has at least two levels, a first level of rank is associated with the ~~most important~~ geographic features of greater importance and a second level of rank is associated with geographic features of lesser importance,

searching said geographic database stored on the computer readable storage medium for data representing a geographic feature using a latitude value, a longitude value and a rank value, wherein said search uses said first and second dimensions of said indexing structure to identify the bounded area in which the latitude value and longitude value falls within, wherein said search uses said third dimension of said indexing structure to identify said level of rank corresponding to said rank value.

Claim 2 (currently amended): A computer-implemented index stored on a computer readable storage medium for a geographic database containing geographic data that represent geographic features, said index comprising:

a single index structure that includes two spatial dimensions and a non-spatial third dimension, wherein said two spatial dimensions define a bounded area represented by a maximum latitude, a maximum longitude, a minimum latitude and a minimum longitude,

wherein said structure is a *k*-d-tree index structure comprising a root node, intermediate nodes and leaf nodes,

Appl. No. 09/706,937

Amdt. dated April 15, 2009

Reply to the office action of December 23, 2008

said geographic data indexed by said structure are searchable spatially using computer-executable instructions and said two spatial dimensions of said index structure and a latitude and a longitude,

said geographic data indexed by said structure are searchable for a non-spatial property of the indexed geographic data that represent the geographic features using computer-executable instructions and said third dimension of said index structure, wherein said non-spatial property of the geographic data includes at least one of: a rank associated with the geographic features represented by the geographic data, a granularity of said indexed geographic data, and a scale associated with said indexed geographic data.

Claim 3 (previously presented): The method of Claim 1 wherein said structure is a *k*-d-tree index structure comprising a root node, intermediate nodes and leaf nodes, wherein each node is part of a parent-child relationship wherein each parent node includes control information from which one of at least two child nodes associated with the parent node are distinguishable based on a search key.

Claim 4 (previously presented): The invention of Claim 1 or 2 wherein said index is homogeneous.

Claim 5 (previously presented): The invention of Claim 1 or 2 wherein said index is non-homogeneous.

Claim 6 (original): The invention of Claim 1 or 2 wherein said geographic features are roads.

Claim 7 (canceled).

Claim 8 (previously presented): The invention of Claim 1 or 2 wherein said rank includes both integers and fractional values.

Claim 9 (previously presented): The invention of Claim 14 wherein said rank includes both integers and fractional values.

Appl. No. 09/706,937

Amdt. dated April 15, 2009

Reply to the office action of December 23, 2008

Claim 10 (previously presented): The invention of Claim 14 wherein said geographic features are roads.

Claim 11 (previously presented): The invention of Claim 14 wherein said index is non-homogeneous.

Claim 12 (previously presented): The invention of Claim 14 wherein said index is homogeneous.

Claim 13 (previously presented): The invention of Claim 14 wherein said k-d tree structure includes a root node, intermediate nodes and leaf nodes, wherein each node is part of a parent-child relationship wherein each parent node includes control information from which one of at least two child nodes associated with the parent node are distinguishable based on a search key.

Claim 14 (currently amended): A computer-implemented index stored on a computer readable storage medium comprising:

a single k-d tree indexing structure that includes a first dimension, a second dimension and a third dimension,

wherein the k-d tree indexing structure is used to index parcels of geographic data, wherein said parcels are collections of said geographic data that represent geographic features encompassed within a bounded area;

wherein said first dimension includes latitude boundary information of said bounded area,

wherein said second dimension includes longitude boundary information of said bounded area, wherein said latitude boundary information and said longitude boundary information define said bounded area represented by a maximum latitude, a maximum longitude, a minimum latitude and a minimum longitude, said parcels of geographic data indexed by said structure are searchable using computer-executable instructions and a latitude value, a longitude value and said first and second dimension of said indexing structure,

wherein said third dimension includes rank information that has at least two levels, wherein a first level of rank is associated with ~~a first set of parcels comprising collections of the most important~~ geographic features of greater importance and a second level of rank is

Appl. No. 09/706,937

Amdt. dated April 15, 2009

Reply to the office action of December 23, 2008

associated with a ~~second set of parcels comprising collections of~~ the geographic features of lesser importance, said data indexed by said indexing structure is searchable for said rank using computer-executable instructions and said third dimension of said indexing structure.

Claim 15 (previously presented): The method of Claim 1 wherein said data that represent geographic features are organized into layers based on said rank associated with the represented features.